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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-120722

(43)Date of publication of application : 18.05.1993

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G11B 7/135
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)Application number : 03-279116

(71)Applicant : SEIKO EPSON CORP

)Date of filing : 25.10.1991

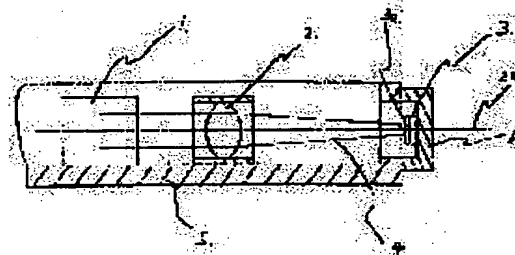
(72)Inventor : ARIMURA TOSHIO
TAKEKOSHI TARO

I) SIGNAL LIGHT RECEIVING METHOD FOR OPTICAL HEAD

)Abstract:

PROPOSE: To reduce the loss of signal received light quantity to the stagnation of a dust and a stain, etc., and to stably detect a signal by shifting and arranging a photodetector from a lens focusing position and focusing a converged beam on the surface of the photodetector.

INSTITUTION: After a laser beam 4 reflected from a disk transmits through the optical element 1 of a beam splitter, etc., and a lens 2, converges to the photodetector 3. In such a case, the photodetector 3 is shifted a little to the lens from the focusing position 2a of the lens 2. In such a state, since the diameter of the laser beam on the cover glass 3a of the photodetector 3 is larger than the same by conventional technique, the loss of the receiving light quantity to the stagnation of a dust and a stain, etc., is reduced and the signal is detected stably.



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AIMS

aim(s)]

aim 1] A signal light-receiving method of an optical arm head characterized by having arranged in an optical arm a lens 2 for optical disks which condenses signal light reflected from a disk to a photo detector 3 using a lens 2, and forms signal detection in a location which defocused said photo detector 3 from focal location 2a of said lens 2.

aim 2] A signal light-receiving method of an optical arm head according to claim 1 characterized by having arranged a photo detector 3 to a regenerative-signal light sensing portion.

aim 3] A signal light-receiving method of an optical arm head according to claim 1 characterized by having arranged a photo detector 3 to a tracking error signal light sensing portion.

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TAILED DESCRIPTION

tailed Description of the Invention]

01]

Industrial Application] This invention relates to the signal light-receiving method of the optical arm head for optical disks.

02]

Description of the Prior Art] As for the optical arm head for optical disks, what condenses signal light using a lens, and arranges a photo detector in the focal location of said lens, and detects the signal from a disk is common. Drawing 5 is a drawing in which the conventional example is shown, and, for 1, as for a lens and 3, optical elements, such as a beam splitter, and 2 are [a photo detector and 4] laser beams. The laser beam 4 reflected from the disk penetrates an optical element 1 and a lens 2, and condenses to the photo detector 3 arranged to focal location 2a of a lens 2.

03]

Problem(s) to be Solved by the Invention] By the signal light-receiving method of the conventional optical arm head for optical disks, when dust, dirt, etc. adhere to the photo detector surface, it may be said that a signal cannot deteriorate markedly or a signal cannot be reproduced. This invention is to abolish an above-mentioned defect.

04]

Means for Solving the Problem] This invention condenses signal light reflected from a disk to a photo detector using a lens, and is characterized by having arranged in a location which defocused a photo detector from a focal location of a lens in an optical arm head for optical disks which performs signal detection.

05]

Example]

Example 1) Drawing 1 is a drawing showing the example of this invention, and, for 1, as for a lens and 3, optical elements, such as a beam splitter, and 2 are [a photo detector and 4] laser beams. The laser beam 4 reflected from the disk condenses to a photo detector 3 after penetrating the optical elements 1, such as a beam splitter, and a lens 2. Drawing 2 is the detail drawing of the photo detector section of drawing 1. In this example, the photo detector 3 is arranged to lens 2 approach rather than focal location 2a of a lens 2. In this condition, even if dust, dirt, etc. adhere to the cover glass 3a surface of a photo detector 3, since it is large, as for light income loss, the diameter of a laser beam on the cover glass 3a becomes small compared with the conventional technology. Moreover, as shown in drawing 3, also when arranging in the location which keeps away a photo detector 3 from a lens 2 to focal location 2a, it thinks.

06] (Example 2) The example shown in drawing 4 applies this invention to MO signal light sensing portion and the tracking error signal light sensing portion of the optical arm head for magneto-optic disks. The laser beam 4 by which tracking radiation was carried out from the source 7 of laser luminescence condenses on a disk 12 after penetrating a collimator lens 8, prism 9, the shuttlecock raising prism 10, and an objective lens 11. First, in MO signal light sensing portion, incidence of the laser beam 4 reflected from the disk 12 is carried out to prism 9 after penetrating an objective lens 11 and the shuttlecock raising prism 10, and it condenses to a photo detector 3 after penetrating Wollaston prism 13 and a lens 2. The beam diameter on a photo detector 3 is made to expand from about 20 micrometers to about 50 micrometers in this example by arranging a photo detector 3 from the focal location of a lens 2 to the 0.5mm lens 2 side. Consequently, even if dozens of micrometers dust adheres, it has composition which can receive a signal. Moreover, in tracking error signal light sensing portion, similarly, incidence of the laser beam 4 reflected from the disk 12 is carried out to prism 9 after penetrating an objective lens 11 and the shuttlecock raising prism 10, and it condenses to a photo detector 20 after penetrating prism 14, the lens mask 18, and a lens 19. This example also arranges a photo detector 20 on a lens 19 side, and constitutes it from a focal location of a lens 19. In addition, application by disk heads other than a magneto-optic disk is also considered.

07]

[effect of the Invention] As mentioned above, the signal detection of the optical arm head for optical disks of this invention which signal light income loss could be made small and stabilized to adhesion of dust, dirt, etc. becomes possible by ZURA and arranging a photo detector from the focal location of a lens, and defocusing the convergence in a photo detector side.

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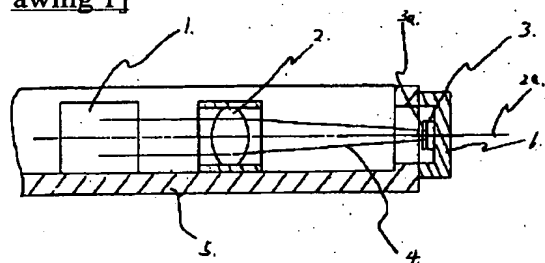
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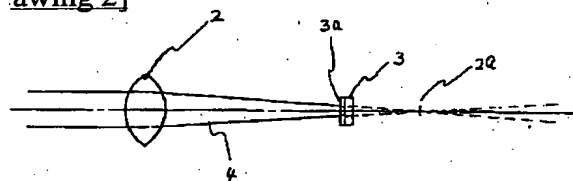
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DRAWINGS

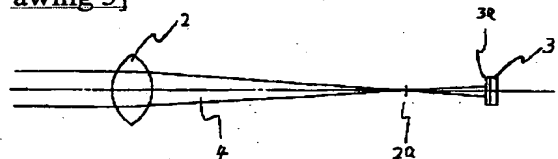
Drawing 1]



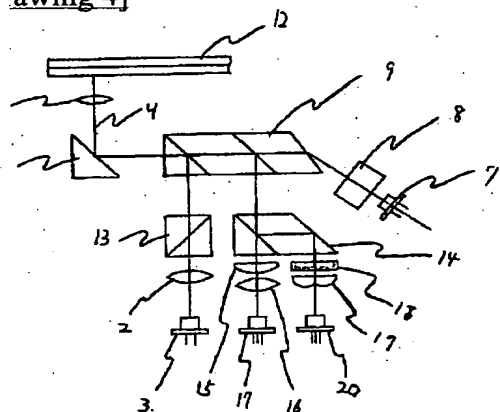
Drawing 2]



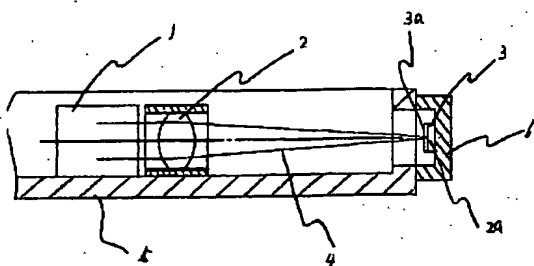
Drawing 3]



Drawing 4]



Drawing 5]



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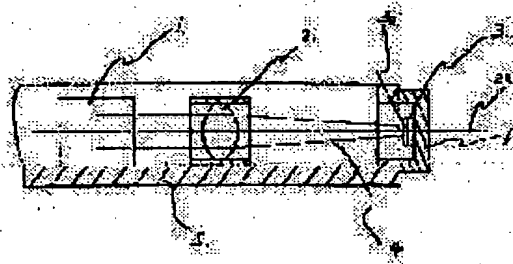
(72)Inventor : ARIMURA TOSHIO
TAKEKOSHI TARO

(54) SIGNAL LIGHT RECEIVING METHOD FOR OPTICAL HEAD

(57)Abstract:

PURPOSE: To reduce the loss of signal received light quantity to the stagnation of a dust and a stain, etc., and to stably detect a signal by deviating and arranging a photodetector from a lens focusing position and focusing a converged beam on the surface of the photodetector.

CONSTITUTION: After a laser beam 4 reflected from a disk transmits through the optical element 1 of a beam splitter, etc., and a lens 2, converges to the photodetector 3. In such a case, the photodetector 3 is arranged a little to the lens from the focusing position 2a of the lens 2. In such a state, since the diameter of the laser beam on the cover glass 3a of the photodetector 3 is larger than the same by conventional technique, the loss of the receiving light quantity to the stagnation of a dust and a stain, etc., is reduced and the signal is detected stably.



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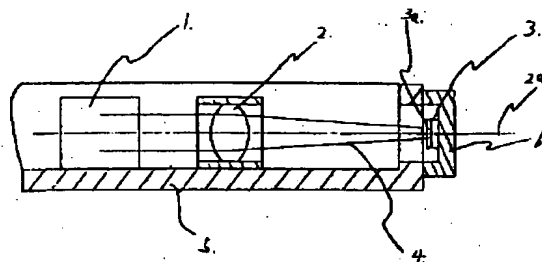
(74)代理人 弁理士 鈴木 喜三郎 (外1名)

(54)【発明の名称】 光ヘッドの信号受光方法

(57)【要約】

【目的】 光ディスク用光ヘッドの信号受光素子部において、受光素子カバーガラス表面の埃、汚れ等の付着に対して、安定した信号検出を行う。

【構成】 受光素子3をレンズ2の焦点位置2aよりレンズ2側に配置し、受光素子3上のビームをデフォーカスする。



【特許請求の範囲】

【請求項1】 ディスクから反射された信号光を、レンズ2を用いて受光素子3に集光し、信号検出を行う光ディスク用光ヘッドにおいて、前記受光素子3を前記レンズ2の焦点位置2aよりデフォーカスした位置に配置した事を特徴とする光ヘッドの信号受光方法。

【請求項2】 前記受光素子3を、再生信号受光部に配置したことを特徴とする請求項1記載の光ヘッドの信号受光方法。

【請求項3】 前記受光素子3を、トラッキングエラー信号受光部に配置したことを特徴とする請求項1記載の光ヘッドの信号受光方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、光ディスク用光ヘッドの信号受光方法に関するものである。

【0002】

【従来の技術】 光ディスク用光ヘッドは、信号光をレンズを用いて集光し、前記レンズの焦点位置に受光素子を配置し、ディスクからの信号を検出するものが一般的である。図5は従来の実施例を示す図面で、1はビームスプリッタ等の光学素子、2はレンズ、3は受光素子、4はレーザービームである。ディスクから反射されたレーザービーム4は、光学素子1、レンズ2を透過し、レンズ2の焦点位置2aに配置した受光素子3に集光する。

【0003】

【発明が解決しようとする課題】 従来の光ディスク用光ヘッドの信号受光方法では、受光素子表面に埃、汚れ等が付着した場合、信号が著しく劣化したり、信号が再生出来ないという事がある。本発明は、上述の欠点をなくす事にある。

【0004】

【課題を解決するための手段】 本発明は、ディスクから反射された信号光を、レンズを用いて受光素子に集光し、信号検出を行う光ディスク用光ヘッドにおいて、受光素子を前記レンズの焦点位置よりデフォーカスした位置に配置した事を特徴とする。

【0005】

【実施例】

（実施例1） 図1は本発明の実施例を示す図で、1はビームスプリッタ等の光学素子、2はレンズ、3は受光素子、4はレーザービームである。ディスクから反射されたレーザービーム4は、ビームスプリッタ等の光学素子1、レンズ2を透過後、受光素子3に集光する。図2は図1の受光素子部の詳細図である。本実施例では、受光素子3をレンズ2の焦点位置2aよりもレンズ2寄りに配置している。この状態で、受光素子3のカバーガラス3a表面に埃、汚れ等が付着しても、カバーガラス3a上でのレーザービーム径が従来技術に比べて大きい為、受光量損失は小さくなる。また、図3に示すように、受

光素子3を焦点位置2aに対して、レンズ2よりも遠ざける位置に配置する場合も考えられる。

【0006】（実施例2） 図4に示す実施例は、本発明を光磁気ディスク用光ヘッドのMO信号受光部、及び、トラッキングエラー信号受光部に応用したものである。レーザー発光源7から出射されたレーザービーム4は、コリメータレンズ8、プリズム9、はね上げプリズム10、対物レンズ11を透過後、ディスク12に集光する。まず、MO信号受光部では、ディスク12から反射されたレーザービーム4は、対物レンズ11、はね上げプリズム10を透過後、プリズム9に入射し、ウォラストンプリズム13、レンズ2を透過後、受光素子3に集光する。本実施例では、受光素子3をレンズ2の焦点位置より0.5mmレンズ2側に配置することにより、受光素子3上のビーム径を約20 μ mから約50 μ mへと拡大させている。この結果、数十 μ mの埃が付着しても、信号を受光できる構成となっている。また、トラッキングエラー信号受光部では同様に、ディスク12から反射されたレーザービーム4は、対物レンズ11、はね上げプリズム10を透過後、プリズム9に入射し、プリズム14、レンズマスク18、レンズ19を透過後、受光素子20に集光する。本実施例でも、受光素子20をレンズ19の焦点位置より、レンズ19側に配置させて構成している。その他にも、光磁気ディスク以外のディスクヘッドでの応用も考えられる。

【0007】

【発明の効果】 上述のように、本発明の光ディスク用光ヘッドは、受光素子をレンズの焦点位置よりズラして配置し、受光素子面での収束ビームをデフォーカスすることにより、埃、汚れ等の付着に対して信号受光量損失を小さく出来、安定した信号検出が可能となる。

【図面の簡単な説明】

【図1】 本発明の実施例を示す図である。

【図2】 本発明の実施例を示す図1の部分詳細図である。

【図3】 本発明の実施例を示す図1の部分詳細図である。

【図4】 本発明の実施例を示す図である。

【図5】 従来の実施例を示す図である。

【符号の説明】

- 1 光学素子
- 2、16、19 レンズ
- 2a 焦点位置
- 3、17、20 受光素子
- 3a カバーガラス
- 4 レーザービーム
- 5 ヘッドきょう体
- 6 受光素子板
- 7 レーザー発光源
- 8 コリメータレンズ

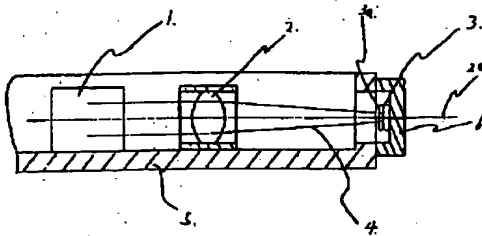
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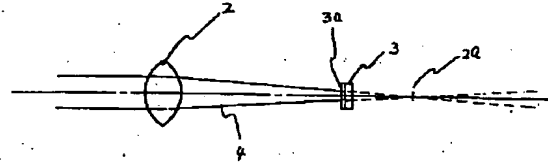
- 3
9、14 プリズム
10 はね上げプリズム
11 対物レンズ
12 ディスク

- 4
13 ウォラストンプリズム
15 シリンドリカルレンズ
18 レンズマスク

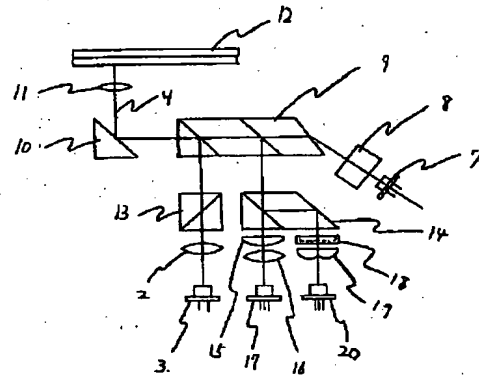
【図1】



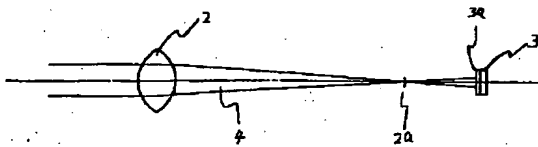
【図2】



【図4】



【図3】



【図5】

